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RESEARCH AND DESIGN OF CORPORATE NETWORKS INFRASTRUCTURE USING SDN TECHNOLOGIES WITH EMPHASIS TO VIRTUAL SWITCH

Abstract:
Software Defined Networking has brought revolution to the world of Network technology which replaces most of the physical devices and control layer of the cloud computing reference model takes control of many Networking Devices.
A Virtual Switch is a software by the virtue of which communication between several virtual machines take place. In contrast to physical switch is, it does not only forwards data packets but also checks the data for security before it is forwarded to other virtual machines.
Interrelated components of software components work together to form a virtual network infrastructure. Out of the software components, the emphasis is targeted on Virtual switch functions and how it differs from the traditional switches.

Keywords:
Switch, Software define networking, control functions, duplex.

INTRODUCTION

PECULARITIES OF VIRTUAL SWITCH VS WITH PHYSICAL SWITCH

1. As it is apparent that on one side we have physical switch device that controls the flow of data and on the other hand this work is done by the firmware in vSwitch.

2. The other difference depends on how data frames are handled. The physical switch stores the MAC addresses of the devices in large table when data is communicated between devices shown in figure.1

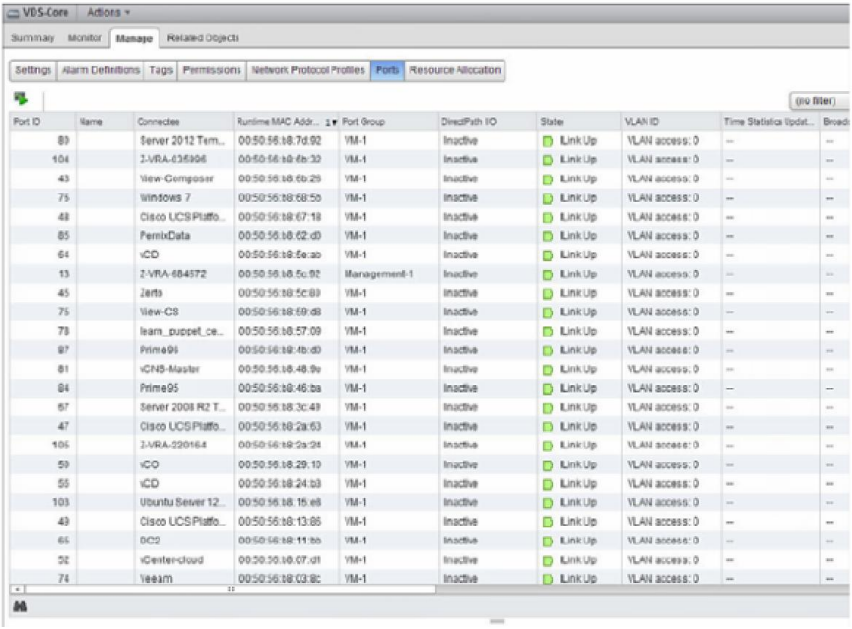


Figure.1

3. While virtual switch does not save the MAC addresses in the table form but only tracks the MAC addresses of the devices that is connected to it. When data frames are coming from the external source, it is learned by the virtual switch due its inherent characteristic and is rejected the external source to communicate with the nodes that is connected to it.

4. As we know that routers and Switches talk to each other using different routing protocols. there is something called RIP, Open Shortest Path First and spanning tree protocols. Spanning tree protocols is used by switches. It allows switches to talk to each other and be able to route packets, the fastest way possible between multiple switches. The biggest thing the spanning tree protocols does for us is it also prevents from something called router loops or routing loops.

The virtual switch lacks spanning tree protocol and has a feature called end-host mode. Ethernet loops are simply not possible in these switches because internal and external interfaces are handled differently.

5. Virtual switches are separated from each other so as to not allow the flow of data between virtual switches, hence no need to prevent bad virtual switch connections.

vSwitch Control Functions

Speed:

The first configuration that we can do is about duplex or speed setting. If we get a normal unmanaged switch we will see that the switch will be atleast 10/100 which means it can either work on 10 megabits/second or 100 megabits/ second. The first computer would use 10 mb/s, so they could only transfer 10 mb/s then a new and fasters computer came out that could use 100mb/s. the unmanaged switches will automatically detect what speed is coming through and will automatically set the port to that speed.

If we are using managed switches, we can go in and actually configure the port to whatever speed we want.

Duplex:

In today's world the communication devices we find are full duplex. What half duplex and full duplex means whether or not we can talk and lesson at the same time or whether the computer or device can talk or listen at the same time.

Half duplex can only talk or listen at the exact same time. For example, Cell phone is full duplex because we can talk and listen at the exact time.

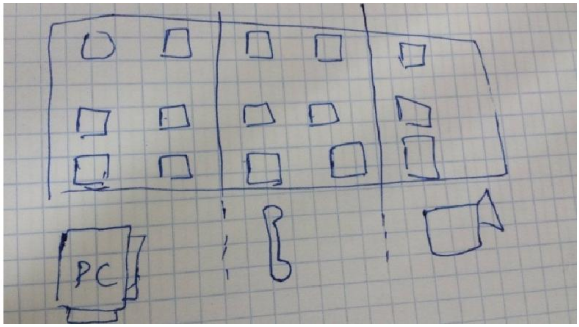
The same is true with the networking equipment. There is no networking equipment that is half duplex but once there was a half-duplex at point of time.

Currently all the modern equipment uses full duplex, computers, laptops, servers, routers etc can talk and send information at the same time. With the managed switches, we can either hardcode the switch ports or we can leave it automatic.

VLAN: Virtual local area network

We can manage VLAN only on managed switches.

Let's say we have multiple caballing all running back to one main wiring clause but we don't want those networks to talk. We want them to be entirely separated. This comes in play with what we call **convergence.** We are using voice over IP, we are using surveillance systems that were using computers. We may want those devices to not been able to talk each other. We want them to put them in little gardens where they may not be able to talk. We don't want a virus getting on to the computer network that is somehow takeover my phone system. VLANS allows us to separate the ports into different virtual LANS, so that these computers on this virtual LANS cannot in any shape or form talk to each other.



Although they are connected to the exact physical switch, because we divided the ports into different VLANS, they cannot communicate to each other.

QOS:

If we download a file or download a webpage, it doesn't really matter how fast or slow that file downloads as long as we getting it at the end of the day but when we are dealing with the voice over IP, it has to be very fast connection, so when I talk, my words has to travel down the line as fast as possible to person is listening, when they talk their words has to travel at the same speed, if there is bottle neck on the line, then everything goes jumble up, so what the manufactures did, they came with QOS or Cisco calls, COS or class of service, so whenever we are sending that on the network, we are sending that data in packets. Packets are the lowest type of data. So basically, what QOS does, is it priorities the packets based on what the packet is, so basically over IP packet is considered higher priority than file sharing packet, a live video stream is lower priority than voice over ip.

If there is a lot of people talking and they are using up the bandwidth. The video stream will be put below all the people using Voice over IP.

Most of the times nowadays the Cisco equipment will automatically detect and do all the quality of service settings but we can also go in and change the QOS settings depending on what we need.

Conclusion

1. By using SDN technologies such as vSwitch, we can reduce the capital expenditure to minimum level.
2. Helps in easy deployment and migration of virtual servers.
3. Virtual switches are managed through a hypervisor which facilitates the users when need to configure hosts.
4. Virtual switches save space and reduces power and cabling costs.
5. Applications and data reside centrally with the Virtual environment and are accessed from anywhere over a network from any device, such as desktop, mobile,

thin client, and so on. This eliminates a consumer's dependency on a specific endpoint device.

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